GEOS-Chem Software Engineering Working Group (SEWG)

GCSC meeting
19 May 2021

Objectives

The GEOS-Chem SEWG consists of GEOS-Chem users and engineers interested in model software development. Its purpose is to coordinate:

1. Optimizing model **performance**
2. Improving **usability**
3. Facilitating **extensibility** to ESMs
4. Developing data analysis and visualization **post-processing tools**
5. Expanding model **quality assurance**

Functioning

Ongoing project information is maintained in a publicly accessible Google spreadsheet

Members meet 2-3 times per year to discuss and document:

- Projects completed since last meeting
- Projects in progress
- Interests and availability of members
- Ideas for future work

Past meeting minutes may be found on the SEWG wiki page

Members

Target members are primarily graduate students and programming staff with interests in software engineering and high-performance computing

Opportunity for members to:

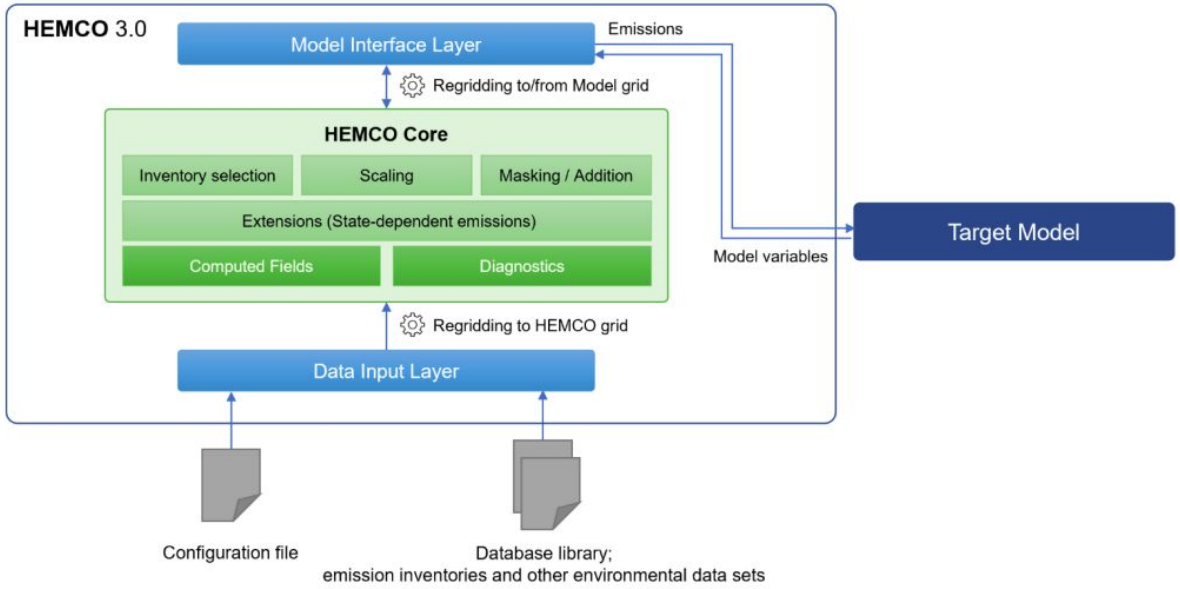
- Contribute to an open-source project
- Increase awareness of all aspects of model development
- Explore interests with mutual benefit to the GEOS-Chem community

All GEOS-Chem users interested in software development are encouraged to join.

Featured projects

HEMCO 3.0 manuscript (Lin et al., GMDD, 2021)

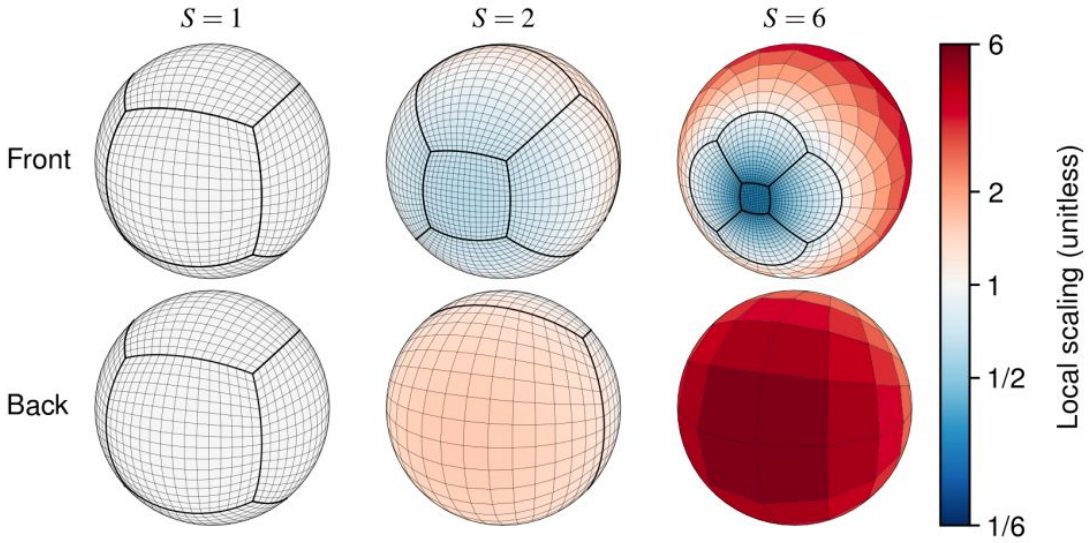
- HEMCO interfaced with GCClassic, GCHP, GEOS, WRF-GC, CESM2
- To be released with GEOS-Chem 13.1.0



Featured projects

GCHP stretched-grid capability (Bindle et al., GMDD, 2020)

- Included in GCHP 13.0.0
- Tutorial available at gchp.readthedocs.io



Featured projects

GCHP profiling on multiple systems

- Compute 1 (Liam Bindle)

  Cannon (Lizzie Lundgren)

  AWS (Will Downs)

  York (Killian Murphy)
- To be included in AIST manuscript

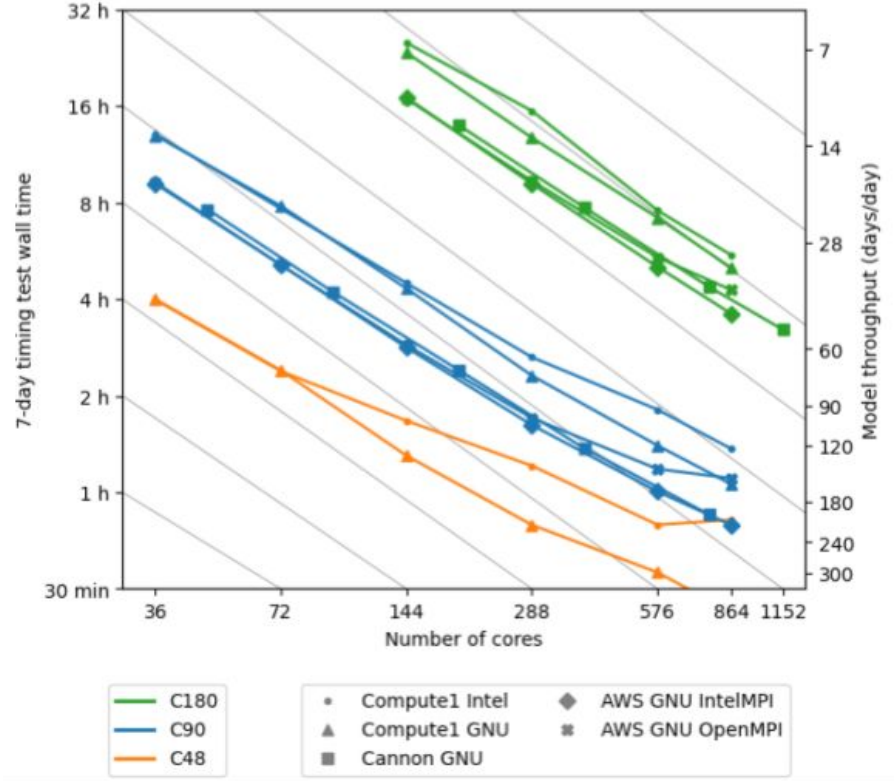


Figure 1: 7-day timing test results for GCHP 13.0.

Ongoing projects

- CESM-GC development
- Consolidation of chemistry mechanisms with KPP
- Migration of user manuals to ReadTheDocs
- Quality assurance (via automatic tests) for GCHP, GCClassic and GCPy
- Profiling and performance improvements for GCHP and GCClassic
- Modularization of GEOS-Chem - Step 1: Split off FAST-JX
- Restructure HEMCO configuration file and convert to YAML